

Serial No. 09/841,380Docket No. 56433US002

Pending Claims

No claim amendments are being submitted at this time. Claims 33 – 59 are pending in this application. For the convenience of the Examiner, a fresh unmarked copy of all the claims is shown below.

1. (Withdrawn) A method for forming a liquid coating on a substrate comprising electrostatically spraying drops of the liquid onto a liquid-wetted target region of a conductive transfer surface, and transferring a portion of the thus-applied liquid from the transfer surface to the substrate to form a wet coating.
2. (Withdrawn) A method according to claim 1 wherein the transfer surface circulates.
3. (Withdrawn) A method according to claim 2 wherein the transfer surface comprises a drum.
4. (Withdrawn) A method according to claim 3 wherein the drum is grounded.
5. (Withdrawn) A method according to claim 2 wherein the transfer surface comprises a belt.
6. (Withdrawn) A method according to claim 1 wherein one or more nip rolls force the substrate against the transfer surface, thereby spreading the applied drops on the transfer surface and decreasing the time required for the drops to coalesce into the coating.
7. (Withdrawn) A method according to claim 6 wherein the nip roll causes the coating to have visually improved uniformity.
8. (Withdrawn) A method according to claim 1 wherein the wet coating is contacted by two or more pick-and-place devices that improve the uniformity of the coating.
9. (Withdrawn) A method according to claim 8 wherein at least one of the pick-and-place devices comprises a roll.

Serial No. 09/841,380Docket No. 56433US002

10. (Withdrawn) A method according to claim 9 comprising three or more pick-and-place rolls.
11. (Withdrawn) A method according to claim 10 wherein three or more of the rolls have different diameters.
12. (Withdrawn) A method according to claim 11 wherein at least one of the rolls is undriven.
13. (Withdrawn) A method according to claim 11 wherein all of the rolls are undriven.
14. (Withdrawn) A method according to claim 1 wherein the transfer surface comprises a rotating endless belt contacted by two or more pick-and-place devices that improve the uniformity of the coating.
15. (Withdrawn) A method according to claim 1 wherein the substrate comprises an insulative substrate.
16. (Withdrawn) A method according to claim 15 wherein the substrate is coated without pre-charging the substrate.
17. (Withdrawn) A method according to claim 1 wherein the substrate comprises paper, plastic, rubber, glass, ceramic, metal, biologically derived material, or a combination or composite thereof.
18. (Withdrawn) A method according to claim 17 wherein the substrate comprises a polyolefin, polyimide or polyester.
19. (Withdrawn) A method according to claim 1 wherein the wet coating is transferred from the conductive transfer surface to a second transfer surface and thence to the substrate.
20. (Withdrawn) A method according to claim 1 wherein the substrate comprises a porous substrate.

Serial No. 09/841,380Docket No. 56433US002

21. (Withdrawn) A method according to claim 1 wherein the substrate comprises a woven or nonwoven web.
22. (Withdrawn) A method according to claim 1 wherein the substrate is coated without substantial penetration of the coating through the substrate.
23. (Withdrawn) A method according to claim 1 wherein the substrate comprises an electronic film, component or precursor thereof.
24. (Withdrawn) A method according to claim 1 wherein the wet coating is dried, cured or otherwise hardened and has a final caliper.
25. (Withdrawn) A method according to claim 1 wherein the drops have an average diameter that is greater than the caliper and the coating is substantially void-free.
26. (Withdrawn) A method according to claim 1 wherein the caliper is less than about 10 micrometers.
27. (Withdrawn) A method according to claim 1 wherein the caliper is less than about 1 micrometer.
28. (Withdrawn) A method according to claim 1 wherein the caliper is less than about 0.1 micrometer.
29. (Withdrawn) A method according to claim 1 wherein the caliper is greater than about 10 micrometers.
30. (Withdrawn) A method according to claim 1 wherein the caliper is greater than about 100 micrometers.
31. (Withdrawn) A method according to claim 1 wherein the drops are neutralized on the transfer surface before being transferred to the substrate.
32. (Withdrawn) A method according to claim 1 wherein the coating is applied in one or more stripes that wholly or partially overlap, that abut one another, or that are separated by uncoated substrate.

Serial No. 09/841,380Docket No. 56433US002

33. (Previously amended) An apparatus comprising a liquid coating composition, a circulating conductive transfer surface that when wet with the liquid coating composition transfers a portion of the liquid coating composition to a substrate, and an electrostatic spray head that applies drops of the liquid coating composition onto a target region of the conductive transfer surface, wherein following startup of the apparatus and one or more circulations of the conductive transfer surface, the target region has a continuous coating of the liquid coating composition before newly applied drops land.

34. (Previously amended) An apparatus according to claim 33 wherein the substrate has a direction of motion and the transfer surface circulates in the direction of motion.

35. (Original) An apparatus according to claim 34 wherein the transfer surface comprises a drum.

36. (Original) An apparatus according to claim 34 wherein the transfer surface comprises a belt.

37. (Original) An apparatus according to claim 33 wherein the transfer surface is grounded.

38. (Previously amended) An apparatus according to claim 33 wherein the electrostatic spray head produces a line of charged droplets.

39. (Previously amended) An apparatus according to claim 33 wherein the electrostatic spray head comprises a plurality of such electrostatic spray heads that apply one or more coating compositions to the conductive transfer surface in one or more lanes.

40. (Previously amended) An apparatus according to claim 39 wherein the plurality of spray heads applies a plurality of coating compositions to one lane.

41. (Previously amended) An apparatus according to claim 39 wherein the plurality of spray heads applies coating compositions to a plurality of lanes.

42. (Original) An apparatus according to claim 33 comprising a plurality of circulating conductive transfer surfaces.

Serial No. 09/841,380Docket No. 56433US002

43. (Original) An apparatus according to claim 33 further comprising one or more nip rolls that force the substrate against the conductive transfer surface.

44. (Previously amended) An apparatus according to claim 33 further comprising two or more pick-and-place devices that can periodically contact and re-contact the wet coating at different positions on the substrate, wherein the devices have periods that improve the uniformity of a coating on the substrate compared to a coating made without such devices.

45. (Original) An apparatus according to claim 44 wherein at least one of the pick-and-place devices comprises a roll.

46. (Original) An apparatus according to claim 45 comprising three or more pick-and-place rolls.

47. (Original) An apparatus according to claim 46 wherein three or more of the rolls have different diameters.

48. (Original) An apparatus according to claim 46 wherein at least one of the rolls is undriven.

49. (Original) An apparatus according to claim 46 wherein all of the rolls are undriven.

50. (Previously amended) An apparatus according to claim 46 further comprising the substrate, wherein the substrate comprises a rotating endless belt or moving web, and the rolls rotate with the belt or web.

51. (Previously amended) An apparatus according to claim 33 further comprising the substrate, wherein the substrate comprises an insulative substrate.

52. (Previously amended) An apparatus according to claim 51 further comprising the substrate, wherein the substrate comprises plastic.

Serial No. 09/841,380Docket No. 56433US002

53. (Original) An apparatus according to claim 33 wherein the coating is transferred from the conductive transfer surface to a second transfer surface and thence to the substrate.

54. (Previously amended) An apparatus according to claim 33 further comprising the substrate, wherein the substrate comprises a porous substrate.

55. (Previously amended) An apparatus according to claim 54 further comprising the substrate, wherein the substrate is coated without substantial penetration of the coating through the substrate.

56. (Previously amended) An apparatus according to claim 33 further comprising the substrate, wherein the substrate comprises a woven or nonwoven web.

57. (Previously amended) An apparatus according to claim 33 further comprising the substrate, wherein the substrate comprises an electronic film, component or electronic component precursor.

58. (Original) An apparatus according to claim 33 wherein the conductive transfer surface is grounded and substantially none of the charges generated by the electrostatic spraying device are transferred to the substrate.

59. (Original) An apparatus according to claim 33 wherein the spray head produces drops having an average drop diameter, the transfer surface transfers a coating having an average caliper to the substrate, the average caliper is less than the average drop diameter, and the transferred coating is substantially void-free.

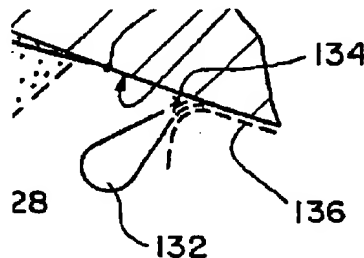
Serial No. 09/841,380

Docket No. 56433US002

Rejection under 35 U.S.C. §102

Claim 33 was rejected under 35 U.S.C. §102(e) as being anticipated by Hess (U.S. Patent No. 6,503,325 B1). Applicants assume that the rejection was actually intended to apply to claims 33 – 35 since claims 34 and 35 are referred to in the Office Action at page 3, lines 3 – 4. Applicants request withdrawal of this rejection. Hess does not show an apparatus of any of claims 32 – 35. A worker of ordinary skill in the art would not be enabled by Hess to make such an apparatus.

Hess says that it would be “feasible” to employ a transfer roll in his device (see col. 6, lines 39 – 43) but does not provide further details and does not enable a device “wherein following startup of the apparatus and one or more circulations of the conductive transfer surface, the target region has a continuous coating of the liquid coating composition before newly applied drops land”. This deficiency is acknowledged at page 3, lines 14 – 15 of the Office Action (“Hess is silent as how to utilize the spray head with the transfer rollers.”). The recited continuous coating characteristic is not merely a “recitation of intended use” as averred in numbered paragraph 10 of the Office Action. A transfer roll would not automatically provide a continuous coating in the target region where newly applied drops land. This can be further appreciated by reading Hess in its entirety. For example, Hess prefers to use a steam blower to “scrape off” an air boundary layer just before his coating is applied. The steam blower is shown in, for example, Hess Fig. 2 and Fig. 4. This magnified view (taken from Fig. 4) shows steam blower 132:



Hess says that using such a blower will improve the coating result (see, e.g., col. 5, lines 26 – 38). If such a steam blower were to be used on a transfer roll carrying a typical liquid coating, the target region would be dried or blown clean by the blower and there would not be “a continuous coating of the liquid coating composition before newly applied drops

Serial No. 09/841,380Docket No. 56433US002

land". Also, Hess's statements that the coating medium "is transferred to the material web" and that the transfer roll "then transfers the coating layer to the material web" (see e.g., col. 6, lines 41 – 43) imply that the transfer roll transfers the entire quantity of coating medium to the material web. If all of the coating medium is transferred then there will not be "a continuous coating of the liquid coating composition before newly applied drops land". Hess also does not recommend against scraping clean the transfer roll following contact with the material web (a measure employed in the separately-cited Nakajima et al. device shown in U.S. Patent No. 4,847,110). If the transfer roll is scraped clean as taught in Nakajima et al. (and if, as is said in the Office Action at page 4, lines 1-2, "one would look to Nakajima to implement the structures disclosed but not organized in Hess") then there will not be "a continuous coating of the liquid coating composition before newly applied drops land". It is improper to cite Hess as anticipating claims 33 – 35 based on its mere statement that one element of the apparatus is "feasible", when Hess does not show an apparatus that has all the claimed features and when a person following Hess' preferences, Hess' statements and the teachings of others would not obtain a device in which a "target region has a continuous coating of the liquid coating composition before newly applied drops land".

Applicants accordingly request withdrawal of the rejection of claims 33 – 35 under 35 USC §102(e) over Hess.

**Rejection of Claims 33 – 35, 37, 38, 43, 51, 52, 54
and 56 – 59 under 35 U.S.C. §103**

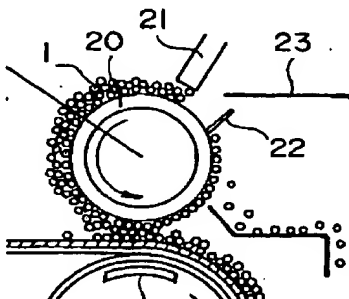
Claims 33 – 35, 37, 38, 43, 51, 52, 54 and 56 – 59 were rejected under 35 U.S.C. §103(a) as being unpatentable over Hess and Nakajima et al. According to the Office Action:

"Thus, one would look to Nakajima to implement the structures disclosed but not organized in Hess, and Nakajima's organization allows for metering of the coating composition. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized the structural organization as disclosed in Nakajima for the elements of Hess as such an organization would allow for transfer and metering of the coating spray."

Serial No. 09/841,380

Docket No. 56433US002

Nakajima et al. scrape their transfer roll clean using blade 22 before recoating the transfer roll. This can be further appreciated by reviewing Nakajima et al. Fig. 6, a magnified portion of which is shown below:



Applicants expressly disagree with the Office Action's assertion that "Hess and Nakajima are considered capable of operating such that following startup of the apparatus, and one or more circulations of the conductive transfer surface, the target region has a continuous coating of the liquid coating composition before newly applied drops land." If Hess and Nakajima et al. were combined as suggested in the Office Action, the resulting device would include Nakajima et al.'s blade 22 and would not provide an apparatus whose target region has a continuous coating of a liquid coating composition before newly applied drops land. All claim limitations must be taught or suggested by the prior art, see MPEP §2143.03.

The Office Action says at the end of numbered paragraph 12 that "Nakajima is not relied on for the scraper, but rather, for the functioning of the sprayer". Hess already shows a sprayer. Nakajima et al. appears in fact to have been relied on for its transfer surface, a feature the Office Action acknowledges is not shown in Hess. Nakajima et al.'s transfer surface includes scraper blade 22, and no proper basis has been given for removing it. Moreover, the Office Action elsewhere relies on "the overall system of Nakajima" (see, e.g., page 6, line 1), and does not explain why it would be proper to rely on Nakajima et al.'s entire system for some purposes but only part of that system for the present rejection. A proposed combination of references cannot change the principle of operation of the prior art invention being modified, see MPEP §2143.01. The Office Action has not set forth a proper basis for combining Hess and Nakajima et al. and for removing Nakajima et al.'s scraper blade 22.

Serial No. 09/841,380Docket No. 56433US002

Regarding claim 56 (which recites that "the substrate comprises a woven or nonwoven web"), the Office Action says that:

"As to claim 56, Hess and Nakajima is capable of being used with a woven or nonwoven web."

"Capability" is not an adequate basis for alleging obviousness. An allegation that a claimed invention is "WITHIN THE CAPABILITIES OF ONE OF ORDINARY SKILL IN THE ART IS NOT SUFFICIENT BY ITSELF TO ESTABLISH *PRIMA FACIE* OBVIOUSNESS", see MPEP §2143.01. The Office Action also says at page 8 that:

"Similarly, with regard to claims that refer to whether the liquid composition is applied to a woven or nonwoven web, or whether it substantially penetrates the web (see page 11, paper 14), these limitations are also taken to be intended use and the paragraph immediately above applies."

Applicants respectfully disagree. Claim 56 recites the substrate as a part of the apparatus, and recites that the substrate comprises a woven or nonwoven web. Applicants are not relying on a "statement of intended use". Neither Hess nor Nakajima et al. show or suggest an apparatus that includes a woven or nonwoven web substrate. Applicants pointed out in their Written Description that the claim 56 apparatus can coat liquids on woven and nonwoven webs without causing the excessive penetration observed with conventional electrostatic or spray coating techniques:

"Through suitable adjustment of the nip pressure, penetration of the wet coating into the pores of a porous target web can be controlled and limited to the upper surface of the porous web, without penetration to the other surface of the web and preferably without penetration to the inner portion of the web. In contrast, when conventional electrostatic or other spray coating techniques are used for direct coating of a porous web, the applied atomized drops frequently penetrate into and sometimes completely through the pores of the web. This is especially true for woven webs with a large weave pattern or for nonwoven webs with a substantial void volume." (see page 12, lines 5 – 12)

Neither Hess nor Nakajima et al. even recognizes this problem, and neither shows or suggests such an apparatus. The prior art must suggest the desirability of the claimed invention, see MPEP §2143.01.

Serial No. 09/841,380

Docket No. 56433US002

Applicants accordingly request withdrawal of the rejection of claims 33 – 35, 37, 38, 43, 51, 52, 54 and 56 – 59 under 35 U.S.C. §103(a) over Hess and Nakajima et al.

Rejection of Claims 36, 42 and 53 under 35 U.S.C. §103

Claims 36, 42 and 53 were rejected under 35 U.S.C. §103(a) as being unpatentable over Hess and Nakajima et al. as applied to claims 33 – 35 above and further in view of Booth, *Evolution of Coating*.

For the reasons already mentioned above, no proper combination of Hess and Nakajima et al. would provide an apparatus of claims 36, 42 or 43. As to claim 36 (which recites a belt), the Office Action acknowledges at page 5, line 15 that Nakajima et al. does not disclose using a belt as the transfer surface. The Office Action says at page 9 that:

"Booth provides motivation for using such a belt".

Pages 5 – 6 of the Office Action explain this motivation as follows:

"Booth discloses using a belt and multiple transfer drums to transfer the coating liquid to the substrate (see page 37 to page 39, and Figures 40 and 41). Booth discloses that the steel belt is particularly well adapted to applying coatings to porous materials wherein a minimal "combining" pressure is needed (page 38, lines 7-10). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention with the desire to coat porous substrates to have added a belt for the transfer mechanism as suggested by Booth in the overall system of Nakajima in order to reduce damage to the substrate."

However, Nakajima et al. does not strive to reduce combining pressure and instead actually requires it in order to press the image forming elements 1 into the adhesive 3 ("In this step, it is preferred that a pressure of about 0.5-10 kg/cm², more preferably of the order of 4 kg/cm² is applied to the image forming elements 1 by the transfer cylinder 20", see col. 11, lines 29 – 32). The asserted reason for combining Booth with Nakajima et al. does not exist and in fact runs counter to Nakajima et al.'s disclosure. A proposed combination of references cannot change the principle of operation of the prior art invention being modified, see MPEP §2143.01.

Moreover, the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability

Serial No. 09/841,380

Docket No. 56433US002

of the combination, see MPEP §2143.1. Booth must be read in its entirety, including its statement that:

"Cast coating in the paper industry is now a mature process with small increases in demand. Coating has become so much more sophisticated and competitive that slow speed processes such [as] casting cannot compete for a larger market share. Likewise, steel belt casting has high capital cost and high maintenance. With new processes such as Ultraviolet (UV) curing, the need for the special properties of belt casting are being preempted."

Clearly, this teaches away from the modern-day use of steel belt casting, and indicates that the proposed modification is *not* desirable. A person of ordinary skill of the art would heed *all* of the statements in Booth and would not be motivated to use Booth's belt or to combine Hess, Nakajima et al. and Booth to make the apparatus of claim 36 as proposed in the Office Action.

As to claims 42 and 53 (which respectively recite a plurality of circulating conductive transfer surfaces and a second transfer surface), the Office action says at page 9 that:

"Similarly, as to the use of multiple transfer surfaces, Booth provides motivation for doing such".

Page 6 of the Office Action explains this motivation as follows:

"Booth discloses the use of multiple transfer surfaces (such as in Figures 30, 31, 32, 33 and 34, see pages 30-33) to meter the coating. Booth discloses that such multiple transfer surfaces are useful for maintaining coating weight control and uniformity (see page 30, lines 12-15). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to [use] a plurality of circulating transfer surfaces wherein the coating is transferred from a first surface to a second transfer surface as disclosed in Booth in order to maintain coating weight control and uniformity."

Booth, Hess and Nakajima would not be combined as suggested in the Office Action. Hess focuses on applying powder coatings to paper or cardboard. Nakajima involves the application of solid or semisolid image forming element particles to a target substrate. Transfer of an applied powder, solid or semisolid coating is not easy. Hess and Nakajima et al. would have no motivation to add an additional transfer surface to their respective

Serial No. 09/841,380Docket No. 56433US002

devices. Doing so would increase capital cost and decrease reliability, without providing any material advantage for their intended coating applications.

Applicants accordingly request withdrawal of the rejection of claims 36, 42 and 53 under 35 USC §103(a) as being unpatentable over Hess and Nakajima et al. in view of Booth.

Rejection of Claims 38 – 41 under 35 U.S.C. §103

Claims 38 – 41 were rejected under 35 U.S.C. §103(a) as being unpatentable over Hess and Nakajima et al. as applied to claim 33 above and further in view of Neidich (U.S. Patent No. 2,833,666).

According to the Office Action:

"One in the art would appreciate that the use of multiple applicator nozzles allows for the treatment of a wider substrate, thus improving the efficiency of the application operation, and would appreciate that such a multiple nozzle setup plus transfer roller as in Hess/Nakajima would allow for the coating of wider substrates. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized multiple applicator nozzles such as in Neidich in the overall apparatus of Nakajima in order to improve efficiency and improve production speed."

However, as acknowledged in the Office Action, Hess is silent as how to utilize the spray head with the transfer rollers and Neidich does not disclose electrostatic spray nozzles or application to a transfer surface. Except for the fact that all three references involve coating, no proper basis has been given for selecting Neidich from among the thousands of references that generally involve coating and combining it with Hess and Nakajima et al. as proposed in the Office Action. The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggest the desirability of the combination, see MPEP §2143.01. Moreover, for the reasons already mentioned above with respect to the proposed combination of Hess and Nakajima et al., a combination of Hess, Nakajima et al. and Neidich would not provide an apparatus with a target region having a continuous coating of a liquid coating composition before newly applied drops land. All claim limitations must be taught or suggested by the prior art, see MPEP §2143.03.

Serial No. 09/841,380

Docket No. 56433US002

Applicants accordingly request withdrawal of the rejection of claims 38 – 41 under 35 U.S.C. §103(a) as being unpatentable over Hess and Nakajima et al. in view of Neidich.

Rejection of Claims 44 – 50 under 35 U.S.C. §103

Claims 38 – 41 were rejected under 35 U.S.C. §103(a) as being unpatentable over Hess and Nakajima et al. as applied to claim 33 above and further in view of Hall (U.K. Patent No. 1,278,099).

According to the Office Action:

"Hess and Nakajima do not disclose multiple pick and place devices.

"Hall discloses multiple pick and place devices, and further discloses that a minimum of five rollers, sometimes two rollers, be used per side coated (column 1, lines 41 -46). Hall discloses that such devices smooth the coating, thus improving the coating. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized such rollers in order to improve the coating."

Except for the fact that all three references involve coating, no proper basis has been given for selecting Hall from among the thousands of references that generally involve coating and combining it with Hess and Nakajima et al. as proposed in the Office Action. If the proposed combination of Hess, Nakajima et al. and Hall was nonetheless made, the result would not provide an apparatus with a target region having a continuous coating of a liquid coating composition before newly applied drops land. All claim limitations must be taught or suggested by the prior art, see MPEP §2143.03.

Applicants accordingly request withdrawal of the rejection of claims 44 – 50 under 35 U.S.C. §103(a) as being unpatentable over Hess and Nakajima et al. in view of Hall.

Conclusion

None of the cited references whether taken alone or in any proper combination shows an apparatus with a circulating conductive transfer surface in which following startup of the apparatus and one or more circulations of the conductive transfer surface, a target region on the conductive transfer surface for applied drops has a continuous coating of the liquid coating composition before newly applied drops land. Applicants

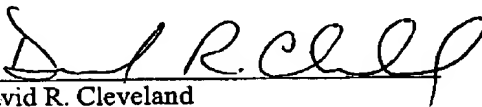
Serial No. 09/841,380

Docket No. 56433US002

accordingly request reconsideration and withdrawal of the rejections and passage of this application to the issue branch.

Respectfully submitted on behalf of
3M Innovative Properties Company

September 18, 2003



David R. Cleveland
Registration No: 29,524
612-331-7412 (telephone)
612-331-7401 (facsimile)
Customer No. 23322

IPLM Group, P.A.
P.O. Box 18455
Minneapolis, MN 55418

All correspondence regarding this application should be directed to:

Brian E. Szymanski
Office of Intellectual Property Counsel
3M Innovative Properties Company
P.O. Box 33427
St. Paul, Minnesota 55133-3427
Telephone: (651) 737-9138
Facsimile: (651) 736-3833

RECEIVED
CENTRAL FAX CENTER

SEP 22 2003

OFFICIAL